

CLAIMS

What is claimed is:

1. A fluid distribution assembly for use in a fuel cell comprising:
an separator plate having a major face;
a boundary element disposed over said major face; and
a flow field having a channel formed in said separator plate at said major face,
said channel and said boundary element defining a cross-sectional configuration which provides
a water accumulation region along a length of said channel.
2. The fluid distribution assembly of claim 1 wherein said water accumulation region is
provided at an acute angle of said cross-sectional configuration.
3. The fluid distribution assembly of claim 1 wherein said channel comprises a ramped
sidewall such that said acute angle is formed at an interface angle between said ramped sidewall
and said boundary element.
4. The fluid distribution assembly of claim 3 wherein said cross-sectional
configuration of said channel is v-shaped.
5. The fluid distribution assembly of claim 4 wherein said cross-sectional configuration
comprises an equilateral triangular cross-section.

6. The fluid distribution assembly of claim 4 wherein said triangular cross-sectional configuration comprises an isosceles triangular cross-section.

7. The fluid distribution assembly of claim 1 wherein said cross-sectional configuration of said channel is w-shaped.

8. The fluid distribution assembly of claim 1 wherein said cross-sectional configuration of said channel is trapezoidal.

9. The fluid distribution assembly of claim 1 wherein said cross-sectional configuration of said channel includes a recessed portion.

10. The fluid distribution assembly of claim 1 wherein said recessed portion of said cross-sectional configuration is v-shaped.

11. A fuel cell comprising:
a separator plate including a flow field formed in a major face thereof, said flow field including a channel having a pair of sidewalls; and
an membrane electrode assembly disposed at said major face over said flow field;
wherein said pair of sidewalls intersect said membrane electrode assembly to form a cross-sectional geometry having a water accumulation region.

12. The assembly of claim 11 wherein said pair of sidewalls intersect said membrane electrode assembly at an acute angle.

13. The assembly of claim 12 wherein said acute angle is defined as a function of an aspect ratio of a channel width and a channel depth

14. The assembly of claim 13 wherein said aspect ratio of said channel is in the range of about 0.25 – 10.

15. The assembly of claim 12 wherein said water accumulation region is defined in at least one corner of said cross-sectional geometry, said at least one corner having an angle not greater than about 75 degrees.

16. The assembly of claim 15 wherein said at least one corner having an angle in the range of 10 – 60 degrees.

17. The assembly of claim 11 wherein said cross-sectional geometry of said channel comprises at least one water accumulation region at a bottom portion of the channel.

18. The assembly of claim 16, wherein said water accumulation region comprises a v-shaped recess formed in said bottom portion of said channel.

19. A fuel cell comprising:

a membrane electrode assembly including a ionically conductive member and at least one electrode disposed at said ionically conductive member; and

an electrically conductive fluid distribution element adjacently disposed at said electrode, said electrically conductive fluid distribution element including a plurality of channels formed in a major face thereof;

wherein each of said plurality of channels includes a first water accumulation region formed in a bottom portion thereof and a pair of ramped sidewalls which intersect said membrane electrode assembly to form second and third water accumulation regions at an interface therebetween.

20. The fuel cell of claim 19 wherein each of said first, second and third water accumulation regions are defined by an acute angle at said bottom and at said interface of the channel.